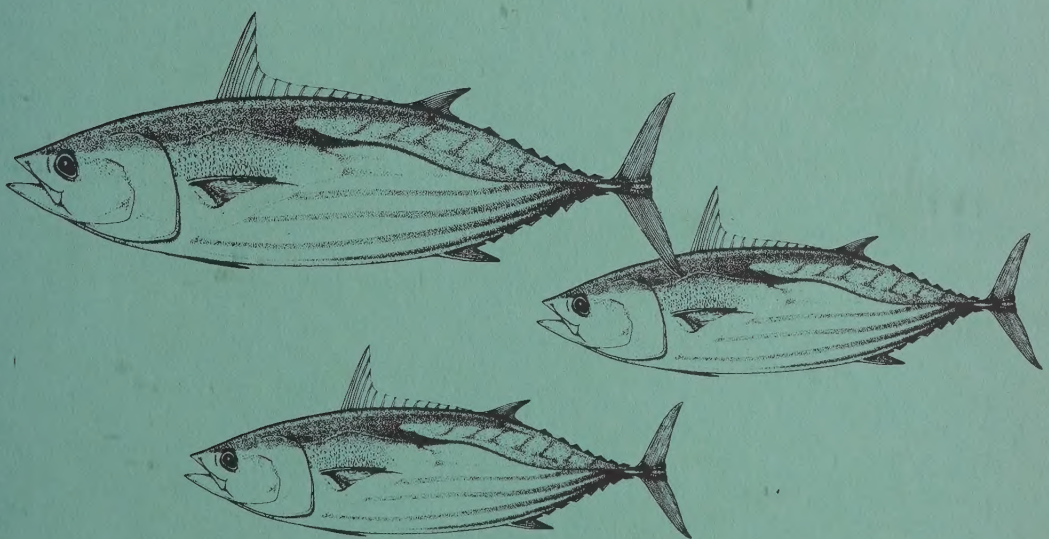
NOVEMBER 1978
No. 11

FISHING INFORMATION

Southwest Fisheries Center-La Jolla, California



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NOVEMBER 1978, No.11

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J. Carr, Deputy Director

PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) charts of winds and pressures for the eastern North Pacific, 4) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 5) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. It contains a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

To cancel delivery of this publication in the event you no longer need to receive it, or to change the delivery address if you are moving but still need to receive it, please notify us by writing: James A. Renner, Editor, Fishing Information, National Marine Fisheries Service, Southwest Fisheries Center, P. O. Box 271, La Jolla, California 92038.

Submitted for publication - December 29, 1978

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ENVIRONMENTAL CHARTS ANALYZED BY:

F. Miller (Figures 8 and 9)
J. Renner (Figures 1, 2, 3, 4, 5, 6, 7, and 15 day supplement)

TECHNICAL EDITOR:
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National Ocean Survey, Pacific Marine Center, Seattle, Washington

Fisheries Research Board of Canada, Pacific Environment Institute, West Vancouver, British Columbia by L. F. Giovando from observations by:
J. Redhead at Langara Island Light; C. Hilliar at Cape St. James Light;
L. Collins at Kains Island Light; M. V. Stewart at
Amphitrite Point Light

Scripps Institution of Oceanography, La Jolla, California

Expendable bathythermograph and salinity observations are made by the mates and engineers of the *Hawaiian Queen* of the Matson Navigation Co. The data are processed under supervision of D. R. McLain at the NMFS Pacific Environmental Group, Monterey, California, using computer facilities of the Fleet Numerical Weather Central, Monterey. The project is partially supported by the National Science Foundation and the Office of Naval Research.

Sea Surface Temperature and Environmental Conditions

Forrest R. Miller

Eastern North Pacific

During November sea surface temperatures (SST) normally decrease over the north Pacific. As a result of increased surface winds and rough seas, associated with fast moving weather systems along the periphery of the Aleutian low, extensive mixing occurs in the ocean surface layers. The Aleutian low is normally centered near 57°N, 145°W and the subtropical high 30°N, 140°W (Figure 1). Between the Aleutian low and the subtropical high pressure centers, surface winds are strongest and ocean surface mixing is most intense. Along the southern boundary of the north Pacific ocean front, which normally lies between 35°N and 45°N, weather systems intensify and move eastward toward the west coast of north America.

During November 1978 the average location of the Aleutian low was near 55°N, 170°E (Figure 2). This was a significant westward displacement from its normal position in the Gulf of Alaska (Figure 1). The subtropical high pressure center was positioned near 35°N, 135°W (Figure 2) with pressures averaging 4 to 8 millibars above normal from the center northward into the Gulf of Alaska. The high pressure system with its anticyclonic wind circulation was the dominant atmospheric feature affecting the ocean surface east of 150°W, especially in the Gulf of Alaska. North of 40°N and west of 150°W the Aleutian low was the prevailing system along which weather fronts frequently developed and moved eastward into the west coast north of 40°N. Maximum surface winds and ocean mixing took place between 45°N and 50°N between the Aleutian low and subtropical high pressure systems (Figure 2). Along the U.S. west coast to 35°N, northerly winds were often strong and contributed to above normal wind mixing in the surface layer and coastal upwelling.

During November, SST's cooled at a rate less than normal over a large part of the eastern north Pacific between 130°W and 155°W from 30°N to 50°N. In this region the SST contours bulged northward (Figure 3) resulting in an increase in the positive departures from normal. The areas of positive SST departures more than 1°C above normal were associated with the persistent high pressure system and lighter than normal surface winds. From October through November 1978 there was a marked increase in the area covered by positive SST departures. Along the U.S. west coast and west of 160°W the negative SST departures did not change significantly from those in October. Because of the dominance of the eastern Pacific high pressure system and the westward displacement of the Aleutian low, the negative SST departures in the central Pacific were smaller and the positive departure markedly larger in November 1978 than in November 1977, especially north of 35°N between 140°W and 160°W (Figure 7).

Based on the October and November 1978 SST departures from normal over the eastern Pacific, it is likely that the positive SST departure patterns shown in Figure 5 will not change much during December 1978 and January 1979. The above normal SST's between 130°W and 150°W will probably contribute to maintaining a high pressure ridge between 130°W and 140°W. The central north Pacific ocean will not have large negative SST departures until the Aleutian low moves eastward to the Aleutian Islands area and the surface westerly winds increase. Positive SST departures greater than 1°C centered along 20°N between 120°W and 150°W in October were greatly diminished in November. Negative SST departures greater than 1°C along the west coast of Baja California have expanded as a result of the strengthening and eastward expansion of the subtropical high pressure system.

Western North Pacific

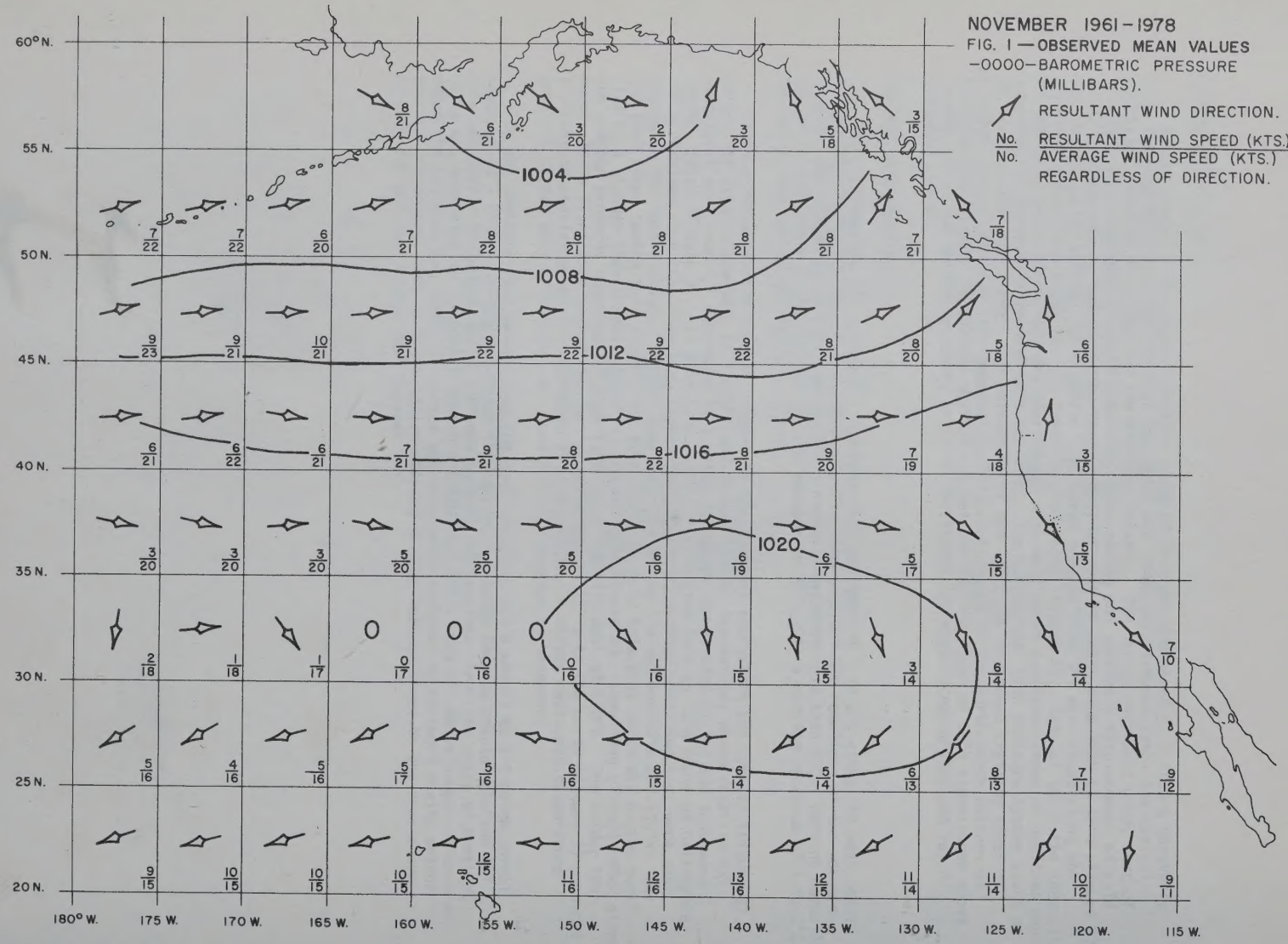
During November the western Pacific north of 35°N was dominated by a strong northerly wind circulation around the Aleutian low which was often very intense (very low central pressures) between Kamchatka and the Aleutian Islands. The strong northwest winds east of northern Japan apparently caused extensive ocean mixing and southward displacement of cold water from the north. As a result, the ocean front east of Japan from 38°N to 42°N (Figure 4) was exceptionally strong, and negative departures greater than 3°C were found along the northern side of the north Pacific front west of 160°E (Figure 6). East of 160°E the intensity of the ocean front along 40°N was near normal with only small scattered areas of positive and negative SST departures between 40°N and 45°N. The subtropical high pressure system south of 35°N was weaker than normal, and between 145°E and 155°E the southward trailing edges of weather systems combined with seasonal cooling contributed to the north-south pattern of negative departures. In October most of the western Pacific south of 30°N experienced above normal SST's; but during November, early winter storms increased ocean mixing and rapid seasonal cooling.

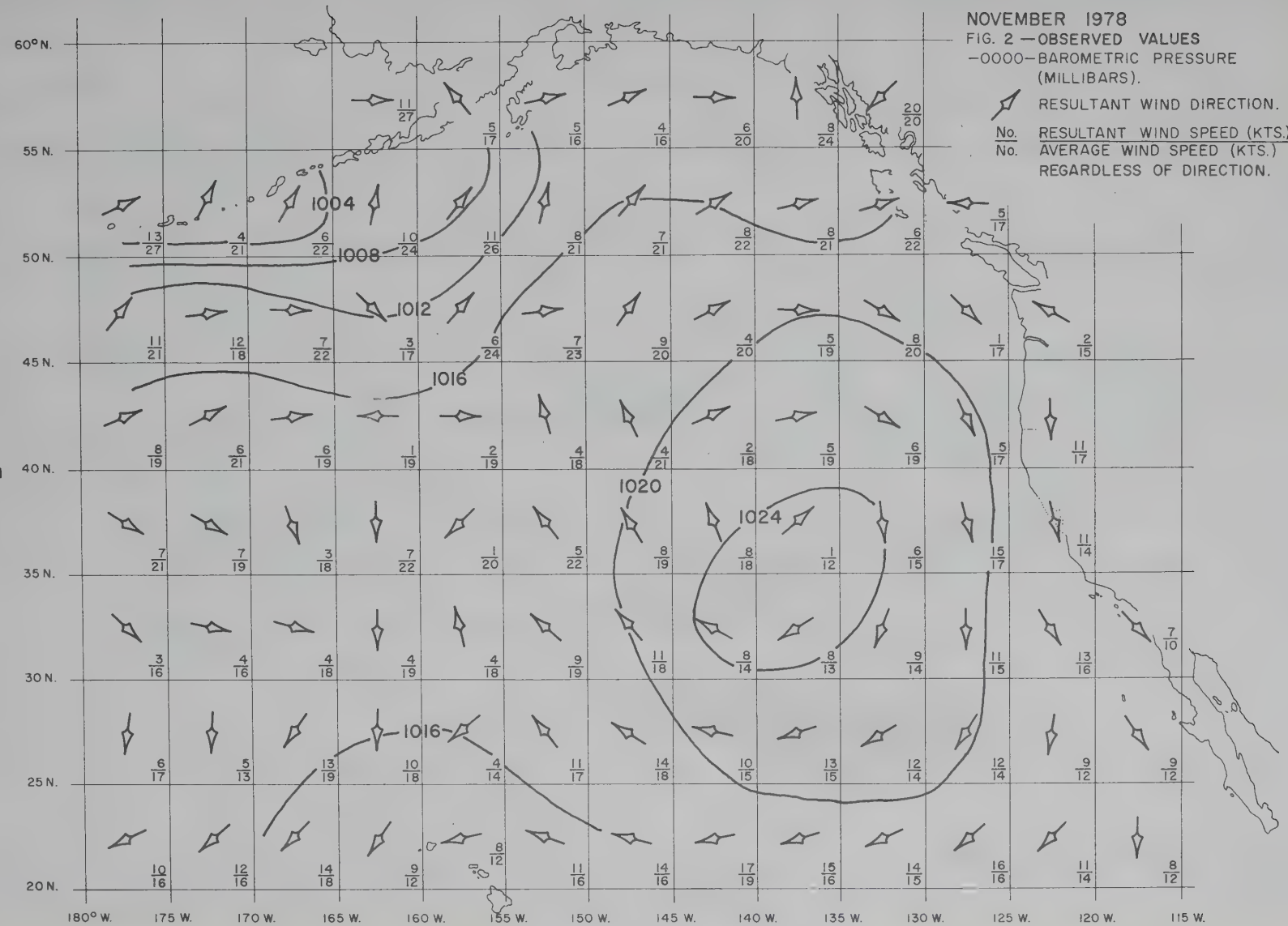
Eastern Tropical Pacific

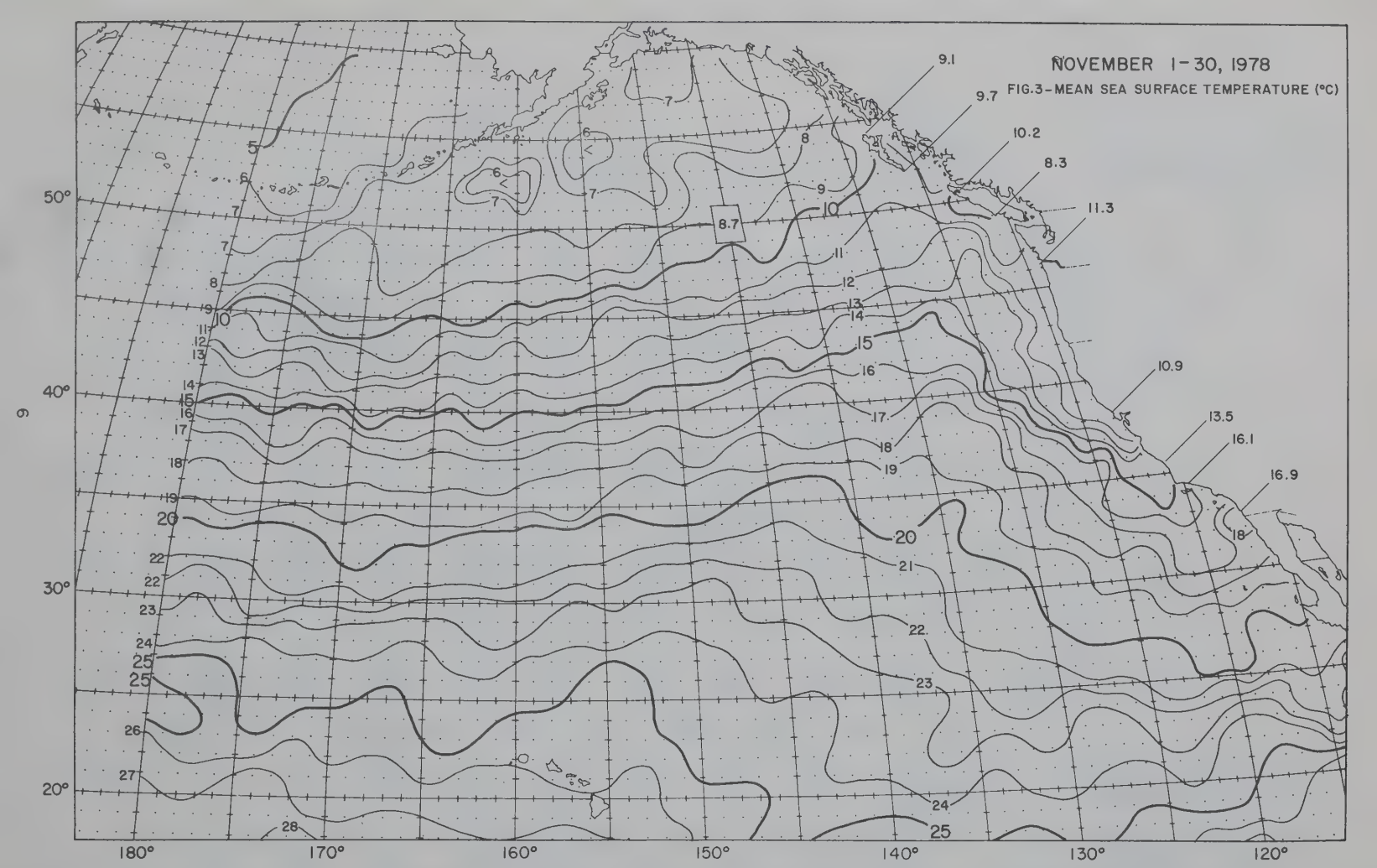
During November, SST's normally decrease with maximums of 1 to 2°C along the west coast of Baja California and Mexico from 10°N to 30°N. Over most of the remainder of the eastern tropical Pacific north of the equator, SST's normally decrease less than 1°C. Warming normally occurs in the southern hemisphere from the equator to 25°S with a maximum increase of 1 to 2°C in the surface layers of the Peru Current.

During November 1978 the SST pattern in the northern hemisphere was typical (Figure 8), except for areas along Baja California and in the Gulf of Tehuantepec where negative SST departures more than 1°C developed as a result of above normal wind mixing and southward moving storms (Figure 9). In some areas east of 110°W from 10°N to 23°N (Gulf of California) SST's remained more than 1°C above normal where weather, surface winds and seas were most favorable for tuna fishing. Another area was from 3°N to 7°N between 85°W and 105°W. For the past three months tuna fishing has been very active in this area which was on the north side of a stonger than normal equatorial ocean front (Figure 8). Upwelling of cold water along the equator produced negative SST departures more than 1°C east of 100°W. The colder than normal SST's along the equator adjacent to above normal SST's to the north (Figure 9) produced a strong equatorial ocean front between 90°W and 100°W. A strong east-west temperature gradient formed west of Ecuador, and tuna fishing improved in November.

In the southern hemisphere along the coast of Peru, SST's were 1 to 2°C below normal south of 10°S (based on only scattered ship reports). South America coastal station SST's were not available in time to be included in this publication. From the coast of northern Chile and extending northwestward toward the equator, SST's were 1°C above normal in an area where the southern high pressure system was frequently weakened by eastward moving weather fronts. Therefore, most of the negative departures have been confined to the near shore (within 100 km) part of the Peru Current.

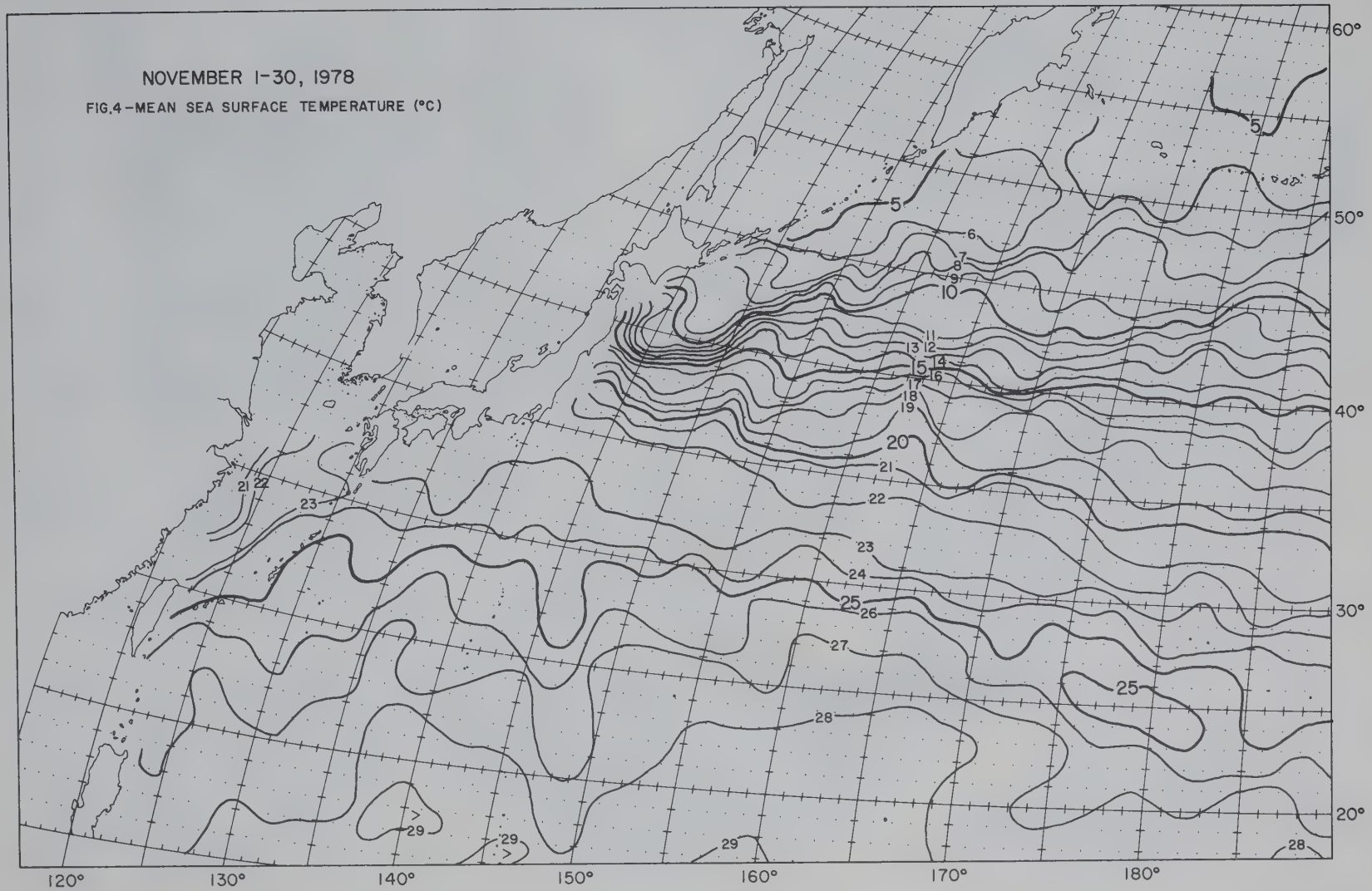

NOVEMBER 1961-1978
FIG. 1 — OBSERVED MEAN VALUES
-0000- BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1008
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

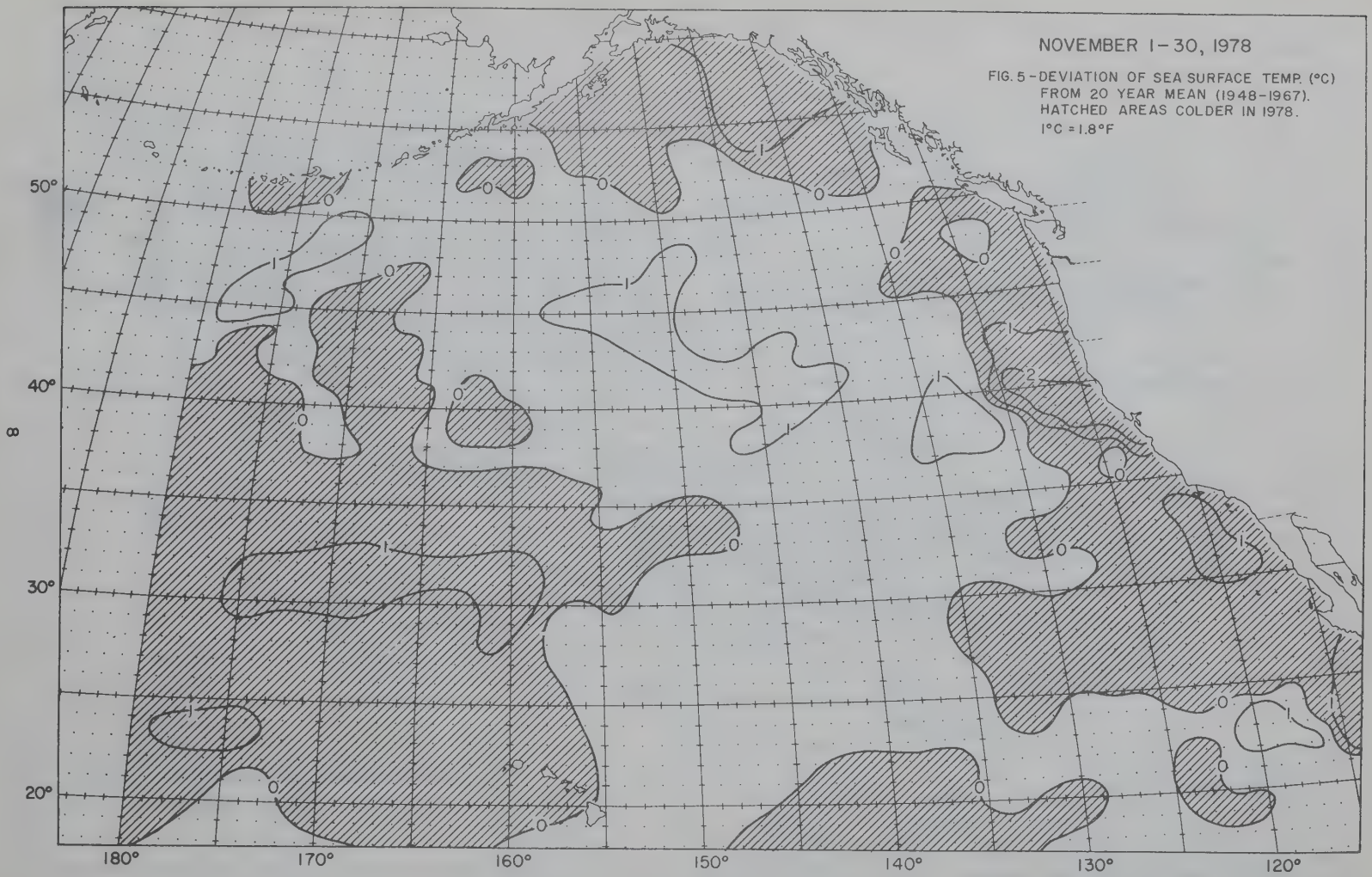

NOVEMBER 1978
FIG. 2 — OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.)
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1004
1008
1012
1016
1020
1024
1016
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.

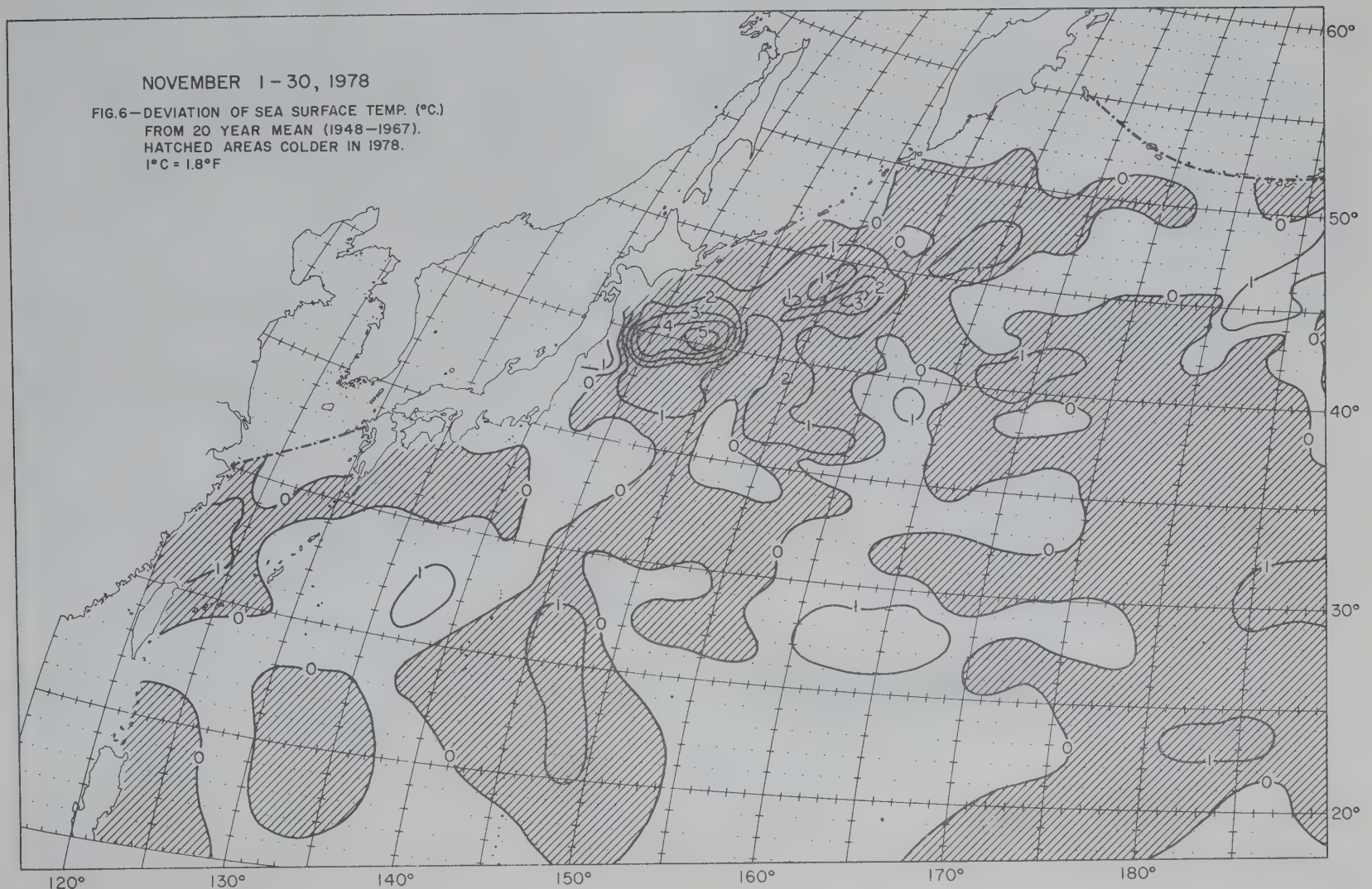

NOVEMBER 1-30, 1978
FIG.3-MEAN SEA SURFACE TEMPERATURE (°C)
9.1
9.7
10.2
8.3
11.3
8.7
10.9
13.5
16.1
16.9
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

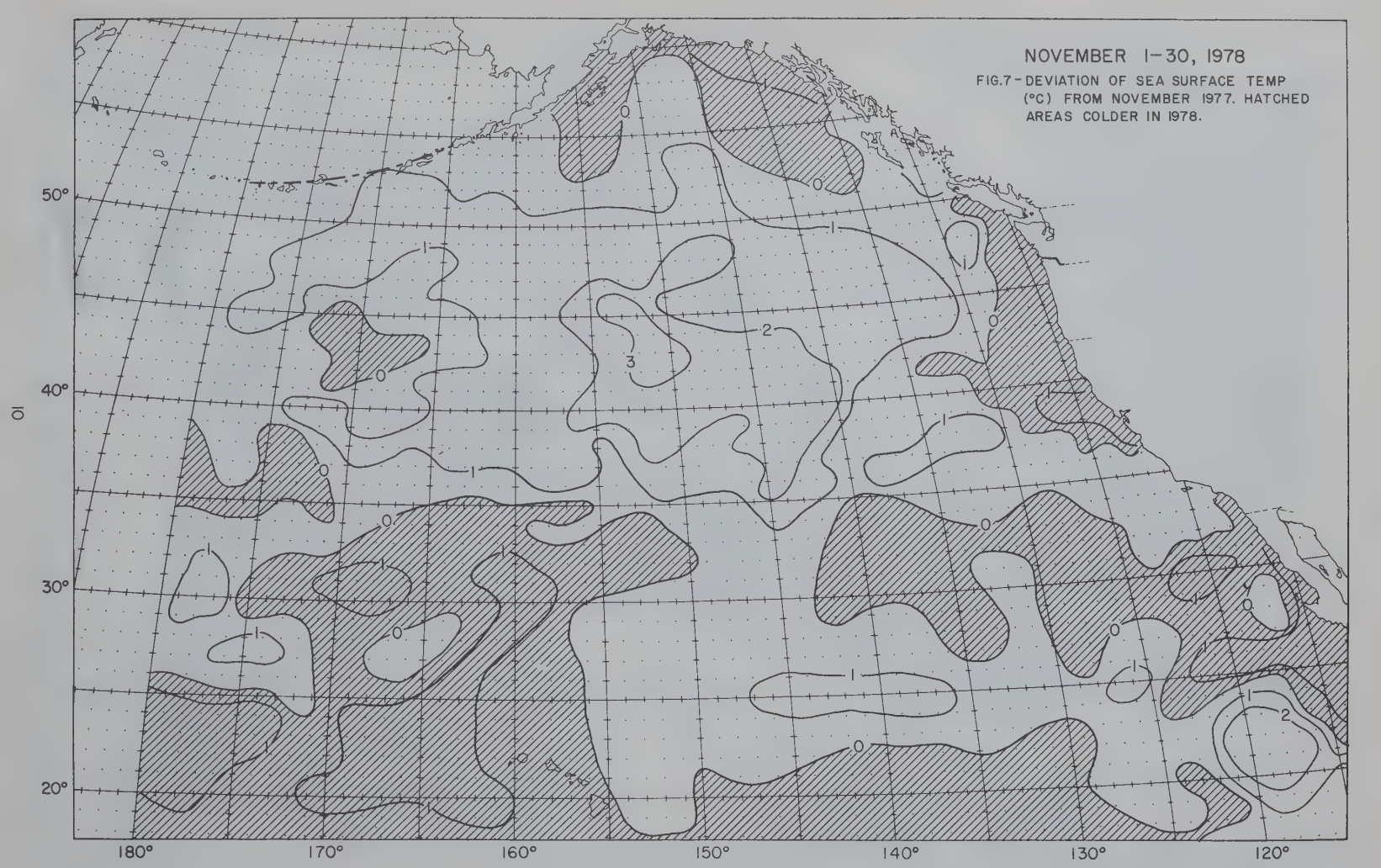
NOVEMBER 1-30, 1978

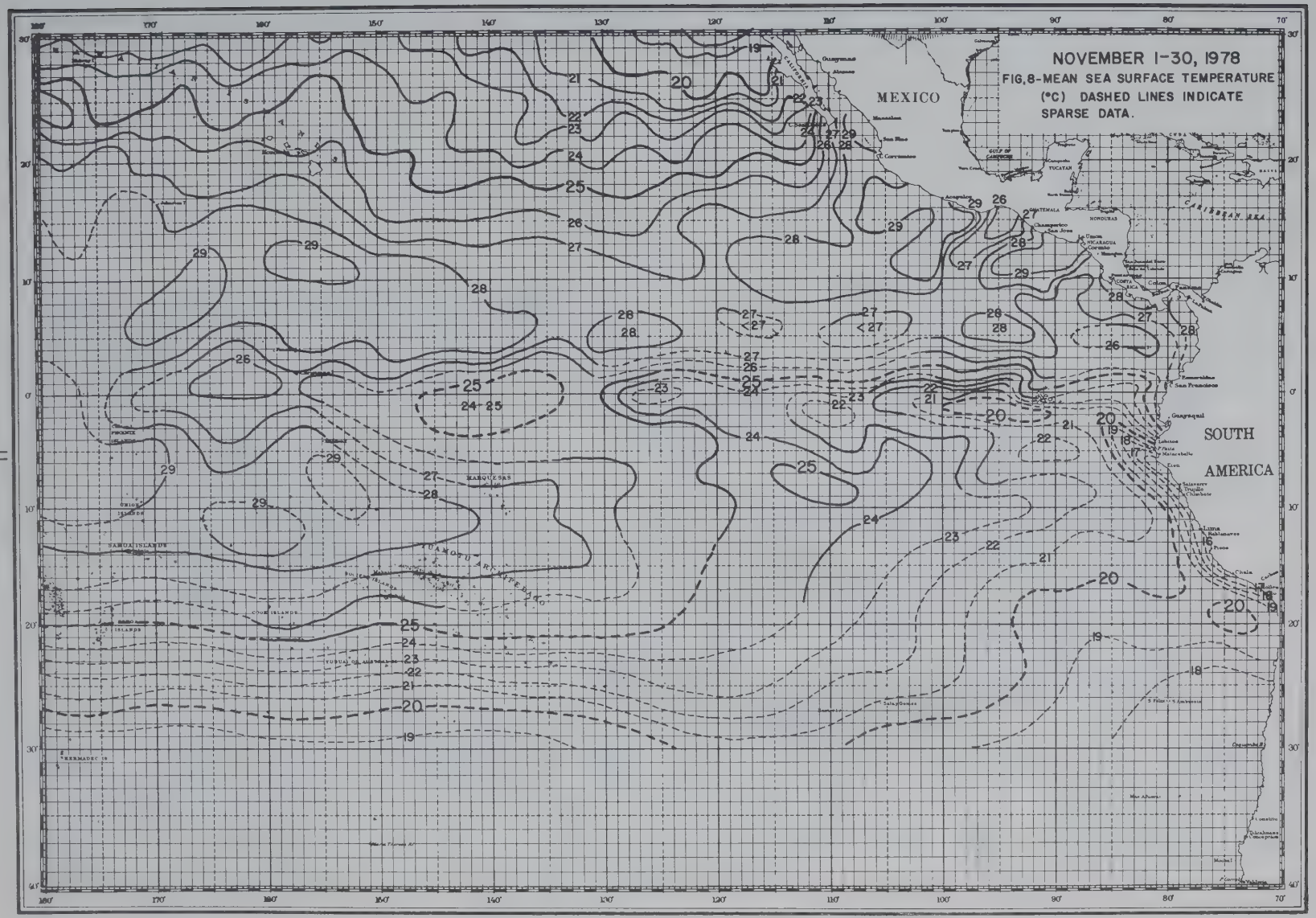
FIG.4-MEAN SEA SURFACE TEMPERATURE (°C)




NOVEMBER 1-30, 1978
FIG. 5 - DEVIATION OF SEA SURFACE TEMP. (°C) FROM 20 YEAR MEAN (1948-1967). HATCHED AREAS COLDER IN 1978.
1°C = 1.8°F
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


NOVEMBER 1 - 30, 1978
FIG.6—DEVIATION OF SEA SURFACE TEMP. (°C.)
FROM 20 YEAR MEAN (1948—1967).
HATCHED AREAS COLDER IN 1978.
1°C = 1.8°F
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


NOVEMBER 1-30, 1978
FIG.7 - DEVIATION OF SEA SURFACE TEMP (°C) FROM NOVEMBER 1977. HATCHED AREAS COLDER IN 1978.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


NOVEMBER 1-30, 1978
FIG.8-MEAN SEA SURFACE TEMPERATURE (°C) DASHED LINES INDICATE SPARSE DATA.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
MARQUESAS
TUAMOTU ARCHIPELAGO
SAN FELIX
SAN AMBROSIO
EASTER
GALAPAGOS
CLIPPERTON
REVILLAGIGEDO
GUADALUPE
CHARLES
CORAL ISLANDS
SAMOA ISLANDS
TUBUAI OR AUSTRAL IS.
HENDERSON I.
SALA Y GOMEZ
DUCIE I.
MOTU ONE
MANUAE
MAUPITI
TAHAA
RAIATEA
TAHITI
MOOREA
MAIAO
TUBUAI
RURUTU
RAPA
MANGAREVA
PITCAIRN I.
OENO I.
HENDERSON I.
VAHITAHI
MAKATEA
ANAA
FAKARAVA
KAUEHI
RANGIROA
TIKEHAU
MAKEMO
HAO
REAO
PUKAPUKA
NORTHUMBERLAND IS.
SAN FRANCISCO
GUAYAQUIL
CHILE

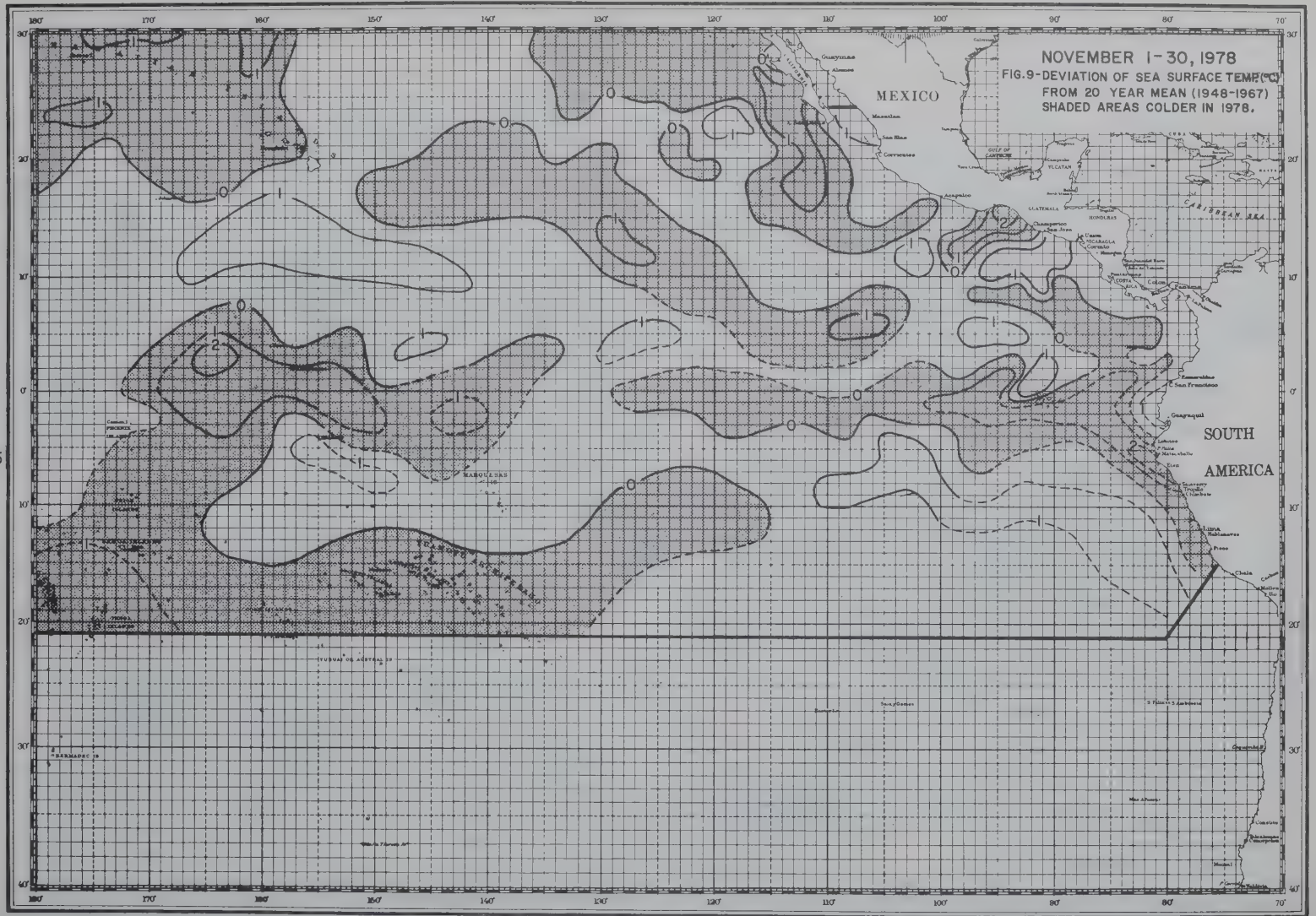

NOVEMBER 1-30, 1978
FIG.9-DEVIATION OF SEA SURFACE TEMP(°C)
FROM 20 YEAR MEAN (1948-1967)
SHADED AREAS COLDER IN 1978.
MEXICO
SOUTH
AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA
RICA
PANAMA
MARQUESAS
ISLANDS
TUAMOTU OR AUSTRAL IS.
BARBADOS
180°
170°
160°
150°
140°
130°
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
40°

FIGURE 10

SHIP HAWAIIAN QUEEN

VOYAGE 232

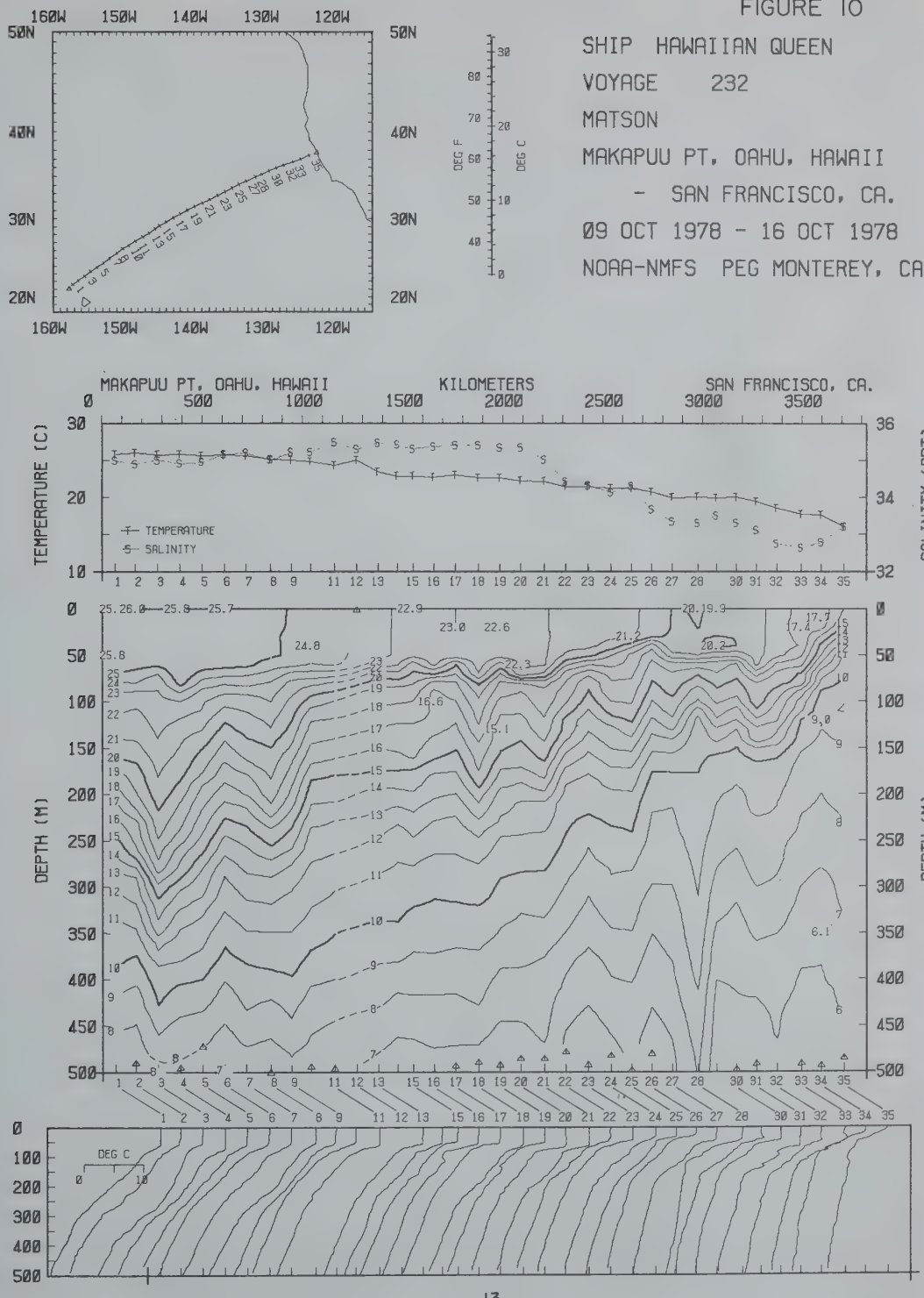
MATSON

MAKAPUU PT. OAHU, HAWAII

- SAN FRANCISCO, CA.

09 OCT 1978 - 16 OCT 1978

NOAA-NMFS PEG MONTEREY, CA.



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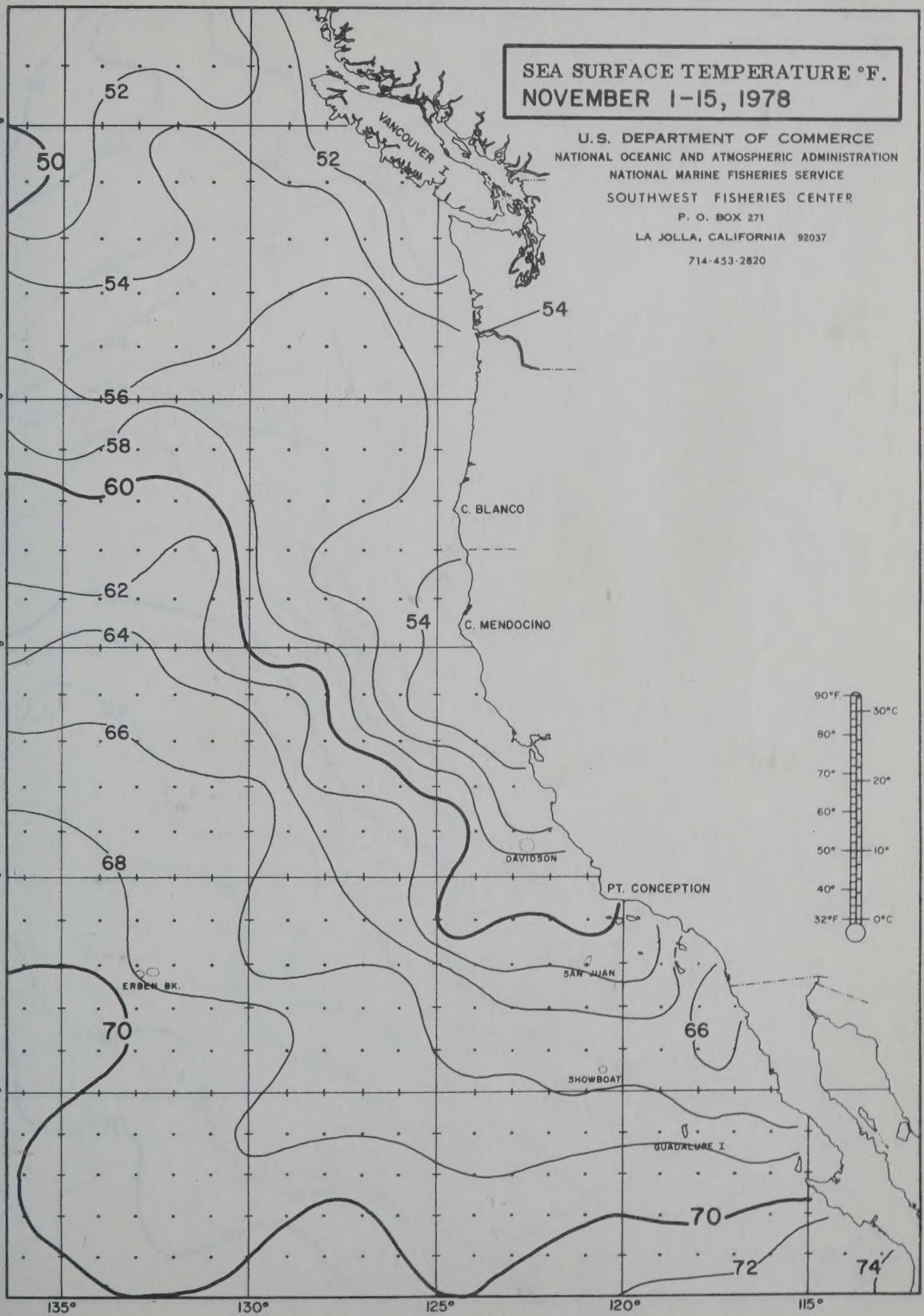

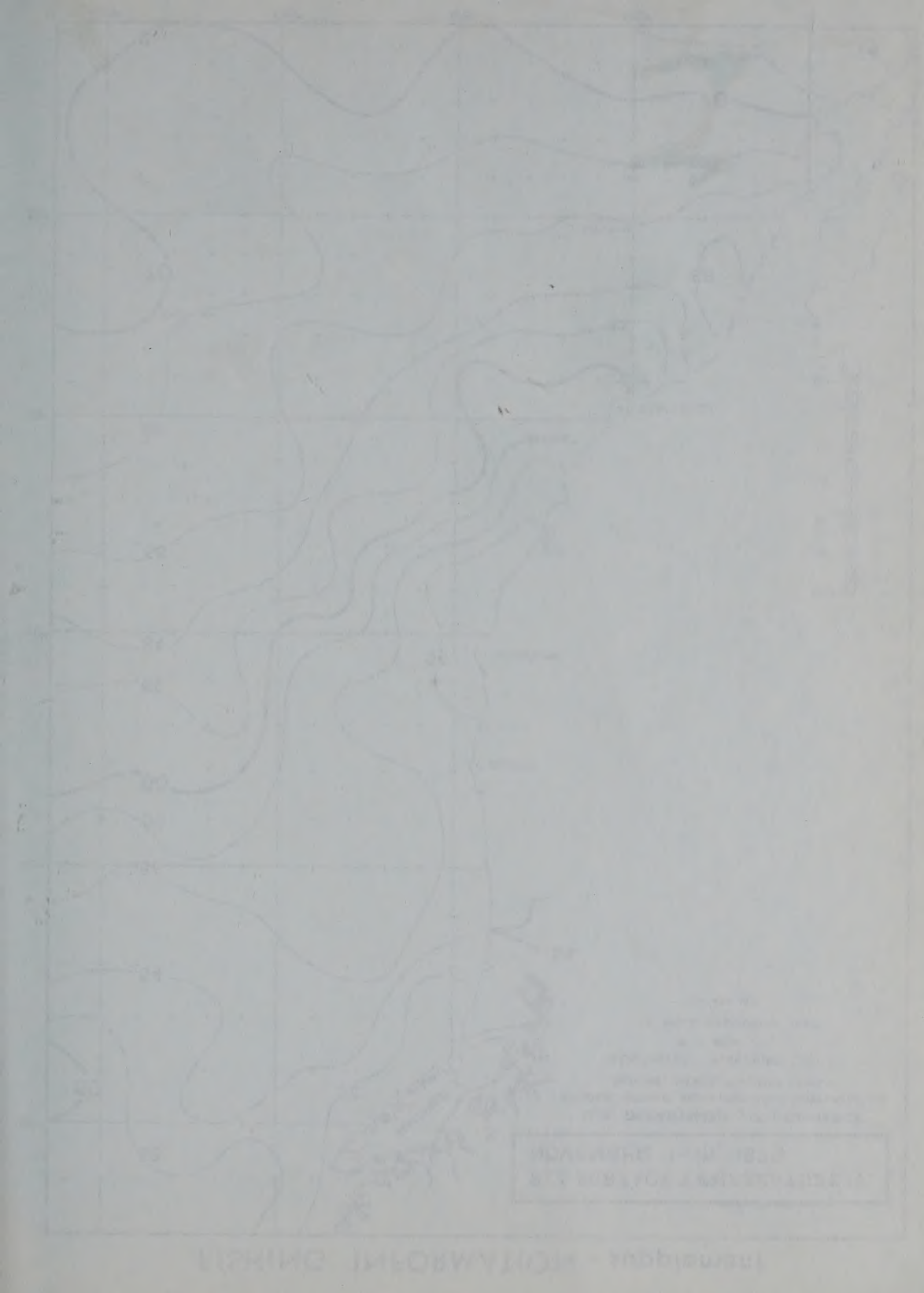

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